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# MODERNIZING FEMA'S FLOOD HAZARD MAPPING PROGRAM



FISCAL YEAR 1999 PROGRESS REPORT

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## Foreword

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The Federal Emergency Management Agency (FEMA) developed a plan in 1997 to modernize the FEMA flood mapping program. Since that time, the plan has continually evolved as new products, processes, and technical specifications have been developed and implemented within present funding levels. This report summarizes the progress made toward implementing the plan during Fiscal Year 1999.

Section 1 of the report overviews the plan, identifies the organizations that have provided written support for the plan, and summarizes the benefits of the plan and the funding requirements.

In 1998, FEMA identified a list of objectives for implementing the modernization plan. These objectives will link to form an enhanced map production process, described in Section 2 of the report. The major components of the proposed process include the mapping needs assessment process, by which all flood mapping needs nationwide will be identified and prioritized; the scoping process, by which a tailored scope of work will be developed with FEMA's mapping partners; and the parallel (i.e., concurrent) production processes.

Based on accomplishments to date and current map modernization priorities, FEMA has updated the list of map modernization objectives, as indicated in Section 3 of this report. Some objectives identified on the original list are now fully developed, ongoing components of the flood mapping program and, thus, have been removed from the list. Others are no longer considered as map modernization objectives but, rather, are continuing under normal operations of FEMA's flood mapping program. Because of resource limitations, some have been deferred as Fiscal Year 1999 objectives. Finally, new objectives have been identified and initiated.

With the changes in the list of map modernization objectives, there are now 23 active objectives relating to mapping products and standards, mapping processes, and other program improvements. Section 4 describes these objectives and identifies the accomplishments to date, the plan for future action, and the deliverables.

## Acronyms Used in This Report

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ASFPM	Association of State Floodplain Managers
CBRS	Coastal Barrier Resources System
CIS	Community Information System
CRS	Community Rating System
CTC	Cooperating Technical Community
DFIRM	Digital Flood Insurance Rate Map
DOQ	Digital Orthophoto Quad
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
FY	Fiscal Year
GIS	Geographic Information System
H&H	Hydrologic and Hydraulic
HQ	Headquarters
IFSAR	InterFerometric Synthetic Aperture Radar
IDIQ	Indefinite Delivery Indefinite Quantity
LIDAR	Light Detection and Ranging
LOMA	Letter of Map Amendment
LOMR	Letter of Map Revision
LOMR-F	Letter of Map Revision – based on Fill
MCC	Mapping Coordination Contractor
MICS	Monitoring Information for Contracted Studies
MNUSS	Mapping Needs Update Support System
MOU	Memorandum of Understanding

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MSC	Map Service Center
NFIP	National Flood Insurance Program
NFIRA	National Flood Insurance Reform Act
NGS	National Geodetic Survey
NRC	National Research Council
OMB	Office of Management and Budget
QA/QC	Quality Assurance/Quality Control
RE	Regional Engineer
REHA	Riverine Erosion Hazard Area
RO	Regional Office
SC	Study Contractor
SOW	Statement of Work
USGS	U.S. Geological Survey

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### 1.0 Introduction

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#### 1.1 Background

In 1997, the Federal Emergency Management Agency (FEMA) designed a plan to modernize the FEMA flood mapping program. Since that time, the plan has continually evolved as new products, processes, and technical specifications have been developed and implemented within present funding levels. This report summarizes recent developments, presents FEMA's enhanced map production processes, and provides a status report on the map modernization objectives.

FEMA's flood maps have served the nation well for insurance and flood disaster mitigation and relief. With implementation of the map modernization plan, the flood hazard information provided to communities will be more accurate and extensive, resulting in safer communities. The plan is a 7-year upgrade to the 100,000-panel flood map inventory and an enhancement of products, services, and processes that entails:

- Converting the maps to a digital format for approximately 14,000 communities (74,500 map panels)—this includes resolving community-identified map maintenance needs for 16,500 map panels);
- Conducting flood data updates and producing digital flood maps for approximately 3,300 communities with inadequate floodplain mapping (17,500 map panels);
- Developing digital flood maps for approximately 2,700 flood-prone communities without flood maps (13,700 map panels);
- Integrating communities, States, and regional agencies into the mapping process through the Cooperating Technical Community (CTC) initiative;
- Converting the maps to metric, as required by Executive Order 12770, and to the North American Vertical Datum of 1988; and
- Improving customer service to make the maps easier to obtain and use, including electronic and digital printing and distribution.

Over the 7-year modernization period, the entire inventory will be converted to a digital format. Additionally, approximately 13,700 new digital panels will be created for flood-prone communities that do not currently have flood maps.

The integration of the map modernization plan objectives into the flood mapping program will result in:

- ✓ Reduced potential for loss of life and property
- ✓ Increased flood insurance policy base
- ✓ Reduced National Flood Insurance Program (NFIP) costs

- ✓ Reduced disaster costs
- ✓ Premiums commensurate with risk
- ✓ Meeting of legal mandates (conversion of maps to metric as per Executive Order 12770, "Metric Usage in Federal Government Programs")
- ✓ Protection of the natural and beneficial values of floodplains

### 1.2 Support for FEMA's Map Modernization Plan

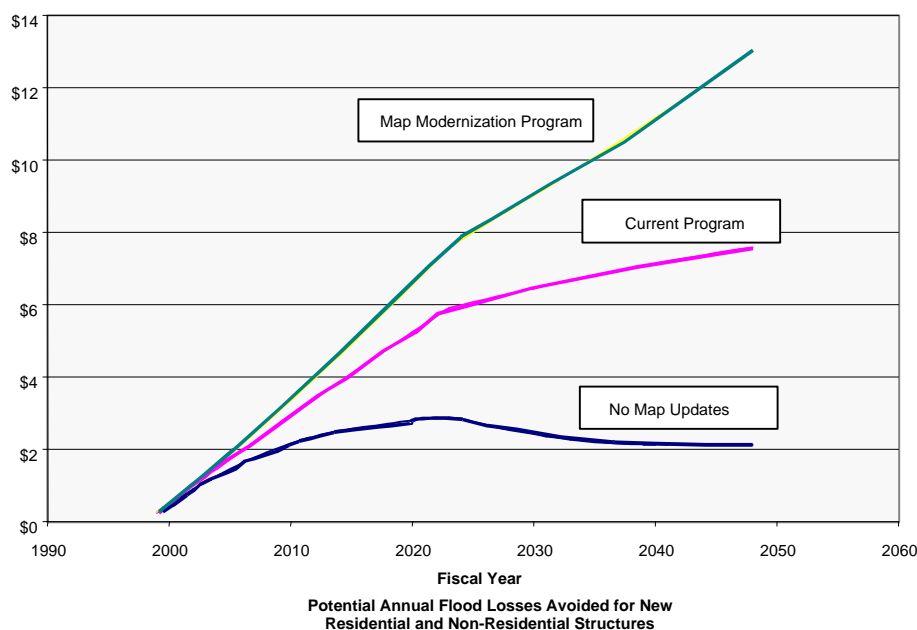
FEMA has sought critical and analytical input for the map modernization plan from all users of the maps, but especially from members of the Congressionally mandated Technical Mapping Advisory Council, who served as advisors in the development of the plan. FEMA's map modernization plan has received widespread and enthusiastic support. Organizations that have provided written support for the plan include:

- Technical Mapping Advisory Council
- American Congress on Surveying and Mapping
- American Society of Civil Engineers
- Association of State Floodplain Managers
- Illinois Department of Natural Resources
- Illinois General Assembly
- National Association of Counties
- National Association of Flood and Stormwater Management Agencies
- National Emergency Management Association
- National Flood Determination Association
- National League of Cities
- National Lenders' Insurance Council
- Ohio River Basin Water Management Council
- Oregon's Seventieth Legislative Assembly
- U.S. Geological Survey
- Western Governors' Association

### 1.3 Benefits

A benefit-cost assessment conducted in accordance with the Office of Management and Budget (OMB) guidance shows the plan to be economically sound and in the nation's best interest. The assessment clearly indicates that the benefits to the nation, the most compelling of which is the potential to spare property from flood damage, dramatically outweigh the costs of the plan. The map modernization plan will help avoid approximately \$26 billion in flood damages to new buildings over a 50-year period. Figure 1 depicts the implications of not implementing the map modernization plan. Moreover, each year of delay in implementation of the plan reduces long-term potential benefits by approximately \$1.5 billion and adds approximately \$17 million to the total cost of the plan.



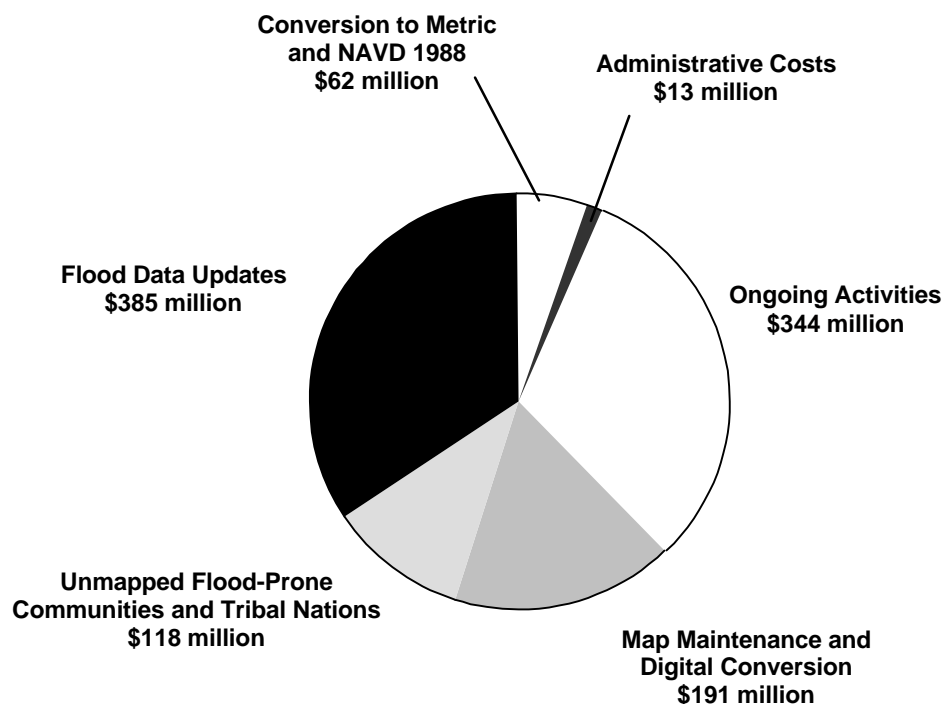


**Figure 1. Implications of not implementing the map modernization plan.**

The map modernization plan also supports FEMA's mission-related strategic goals and associated strategies. Improving the flood mapping program also supports the **Project Impact** initiative and will also strongly support FEMA's initiative to reduce the number of structures suffering **repetitive flood losses**.

### 1.4 Funding Requirements

Current funding levels are inadequate to address projected mapping needs of the NFIP. Thus, without infusion of additional funding, the backlog of outdated maps will continue to grow. Total incremental costs above current funding levels from Fiscal Year (FY) 2001 through FY 2007 are estimated at a minimum of \$750 million. Over the planned 7-year map modernization implementation period, total program costs will be about 3 times greater than the expected annual funding levels of \$52 million. Figure 2 summarizes the major cost components to fully implement the modernization plan over a 7-year period.



**Figure 2. Major cost components to implement the map modernization plan.**

Although all taxpayers benefit, only a small minority currently pays for the flood mapping program. Ideally, funding for the map modernization plan will assess a fair portion of the costs to all beneficiaries.

If the map modernization plan is not funded, a significant portion of these flood damages will result in increased use of the Disaster Relief Fund and uninsured losses to property owners. Thus, the map modernization plan will have far-reaching effects in reducing all types of flood losses and will be a valuable expenditure for the nation.

Currently, all funding options are under review.

## 2.0 Modernized Map Production Process

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### 2.1 Overview of the Modernized Map Production Process

Through the various map modernization objectives, the processes by which FEMA updates maps are being enhanced to:

- ✓ Increase State and regional agency and community involvement in the mapping process, particularly through the CTC initiative.
- ✓ Develop tailored approaches in individual communities that build on the strengths of participants in the mapping program (CTCs, Study Contractors [SCs], Mapping Coordination Contractors [MCCs], and other Federal agencies). The effective use of partnerships will enable FEMA to maximize the capabilities and resources of other stakeholders in a cost-efficient manner.
- ✓ Have FEMA's various mapping partners complete work collaboratively and concurrently.
- ✓ Develop efficient communication tools, such as the Monitoring Information for Contracted Studies (MICS) software.
- ✓ Use more efficient task-order contracting mechanisms for SCs.
- ✓ Evaluate and apply emerging technologies (LIDAR [Light Detection And Ranging], IFSAR [InterFerometric Synthetic Aperture Radar], automated Hydrologic and Hydraulic [H&H] modeling) for cost-effective modeling and mapping.

Figure 3 depicts how several of the map modernization objectives will link to form the modernized mapping production process. The major components of this proposed process are:

- ✓ The mapping needs assessment process will identify all flood mapping needs nationwide, will help FEMA develop cost estimates, and will establish map update priorities each fiscal year.
- ✓ The scoping process will develop a tailored scope of work for FEMA's mapping partners to achieve a "best value" for each mapping project.
- ✓ Production processes will allow for work to be accomplished in parallel (i.e., concurrently by various partners).

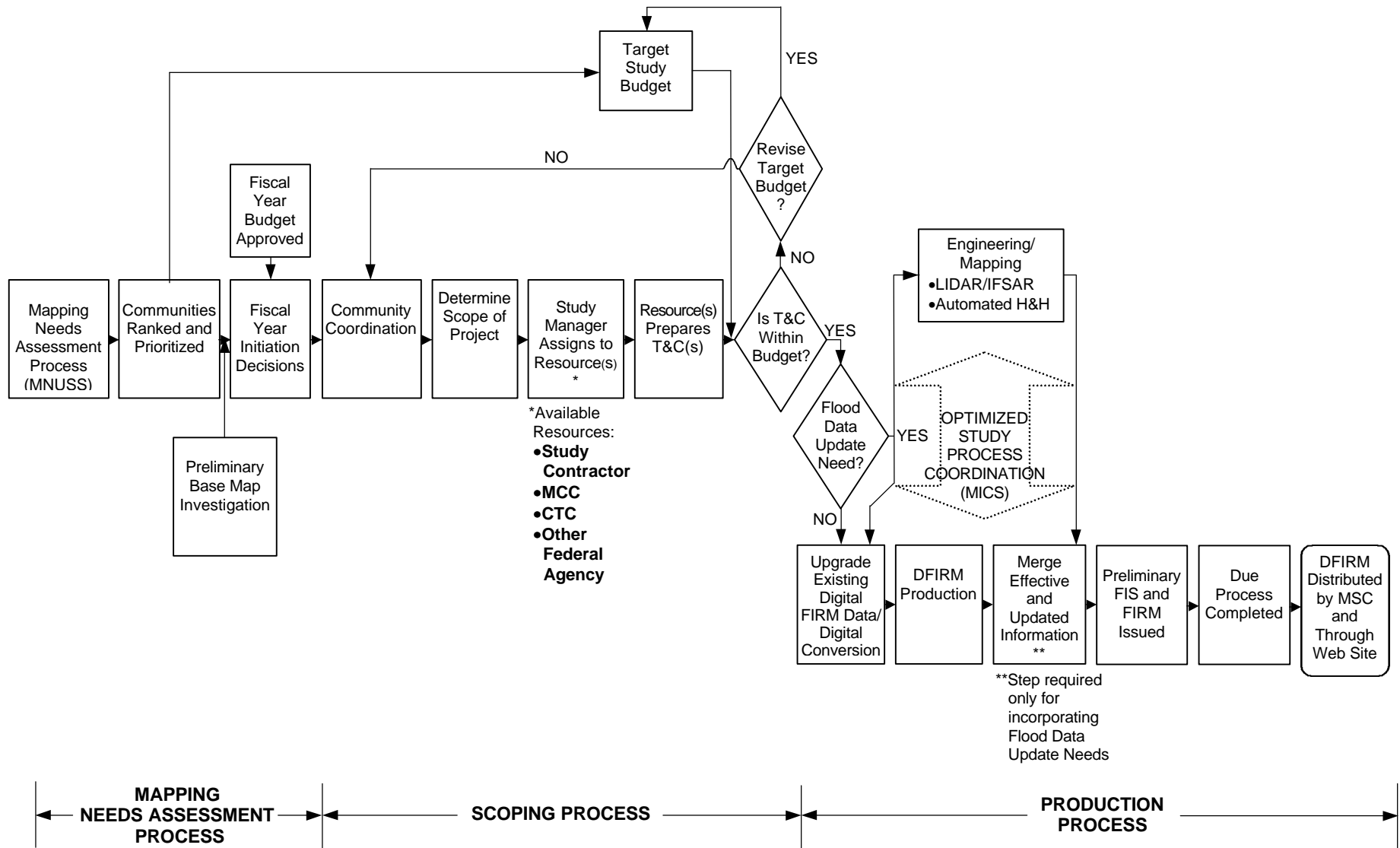


Figure 3. Modernized Map Production Process

### 2.2 Mapping Needs Assessment Process

To determine map update priorities and expend the flood mapping budget in the most cost-beneficial manner, a complete, accurate assessment of flood mapping needs is essential. The Mapping Needs Assessment Process and the Map Needs Update Support System (MNUSS) will serve as the primary tools to document all map update needs nationally and develop cost estimates (which will include engineering, mapping, production, printing, and distribution costs). MNUSS will also be used to rank and prioritize map update needs comparatively. This ranking and prioritization list will then be used in conjunction with the fiscal year budget to determine which map updates to initiate in that fiscal year.

However, because the data currently in MNUSS resulting from the first 5-year cycle relied primarily on communities voluntarily responding to survey letters, it is not currently a comprehensive inventory of national flood mapping needs. Further, the current version of MNUSS was not designed to establish study budgets and comparatively rank and prioritize map updates. Thus, during the second 5-year cycle, a more holistic, objective approach will be used to assess all flood mapping needs for all communities. Enhancements to MNUSS are planned. Ongoing and planned activities for the second 5-year cycle include:

- ✓ FEMA is currently upgrading MNUSS to capture additional data fields and to add the capability to consolidate and rank all mapping needs (flood data update, map maintenance, and/or digital conversion) for a community. Testing of the enhanced MNUSS is planned for FY 1999 and 2000.
- ✓ As part of the CTC initiative, FEMA will be pursuing assessments of community mapping needs as a partnership activity with State and regional agencies; the resultant data will be used to populate the enhanced MNUSS. To assist FEMA's partners in completing such assessments, FEMA has developed guidance on how to conduct objective assessments of community flood mapping needs.
- ✓ Community surveys will continue to be an integral component of the assessment of flood mapping needs. An improved questionnaire is under development for use during the second 5-year cycle. Additionally, FEMA is considering more efficient methods for communities to provide data, such as through the Internet.

If all communities nationally receive detailed, objective assessments, MNUSS truly will be a national inventory of flood mapping needs and could then be implemented as a decision-making tool. The inventory could then be maintained continuously and updated on a real-time basis to ensure that newly identified needs are entered and that actions taken to address needs are properly recorded.

### 2.3 Scoping Process

Once the decision to initiate a community map update is made, the scoping process will begin. The foundation for study scoping will be the detailed assessment of community mapping needs (flood data update, map maintenance, and/or digital conversion) completed as part of the Mapping Needs Assessment Process.

The scoping process will include coordination and outreach to the community. For communities with flood data update needs and for large countywide studies, the community coordination will typically be through face-to-face meetings conducted by the regional study manager. Prior to the meeting, the regional study manager may ask FEMA's MCCs to prepare a study scoping package from data and information available through the Mapping Needs Assessment Process and to complete preliminary base map research. The meeting will be attended by community officials, the SC, and State and/or regional agency officials. Depending on the extent and nature of the update, the regional study manager may also have the MCC and/or other Federal agencies attend the meeting.

For communities for which the map update will be a digital conversion and/or map maintenance with no flood data updates, the community coordination may be accomplished via teleconferences with the community, State and/or regional agencies, and the MCC.

The purpose of the coordination meetings (or teleconferences) will be to establish the scope of the project, including:

- ✓ Validating map update needs;
- ✓ Determining study reaches and methods for engineering analyses and floodplain mapping;
- ✓ Identifying topographic data sources;
- ✓ Determining Digital Flood Insurance Rate Map (DFIRM) options to be included; and
- ✓ Selecting the base map.

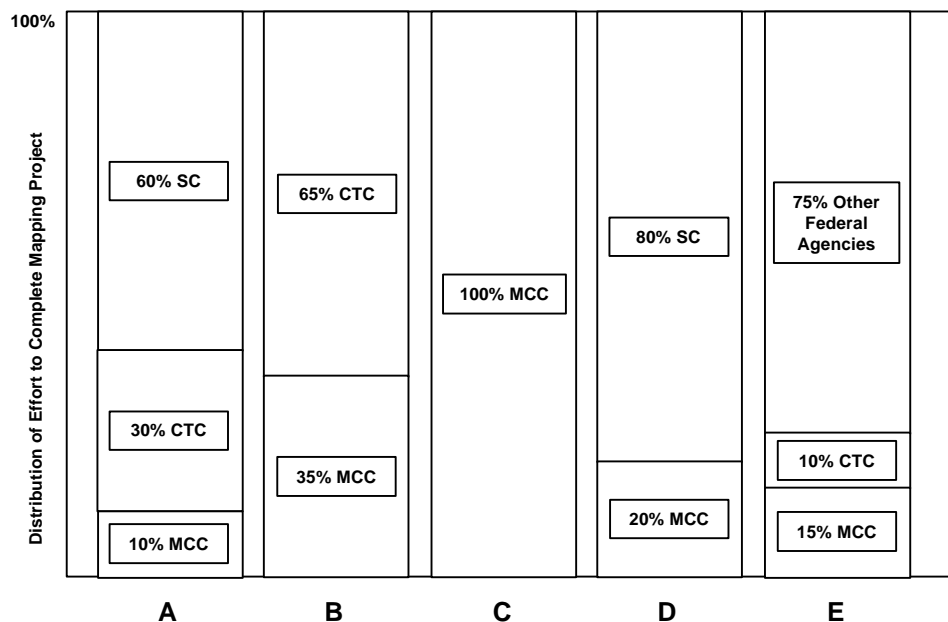
The coordination meeting (or teleconference) will also be for the regional study manager to determine how to distribute the work required to complete the mapping project based on the strengths and technical capabilities of the available resources to achieve a “best value” for FEMA. For most mapping projects, the resources available to the study manager will include:

- ✓ SC
- ✓ MCC

- ✓ CTC (local community, State, or regional agency)
- ✓ Other Federal agency

After the coordination meeting (or teleconference), the regional study manager will assign responsibilities for the mapping project to the available resources. Unlike the present process, which has FEMA's contractors performing essentially the same functions for each study, the modernized process will allow for greater flexibility in roles based on the strengths of the resources available to complete a given project.

Figure 4 illustrates how the assignment of responsibilities will vary for various mapping projects. Example A in Figure 4 depicts a map update that combines the efforts of the CTC and SC to complete the H&H modeling, floodplain mapping, and DFIRM production, with support from the MCC for up-front research and post-preliminary processing. The SC would provide Quality Assurance/Quality Control (QA/QC) of the CTC work. Example B depicts a project with H&H modeling, floodplain mapping, and DFIRM production by the CTC and up-front research, ongoing coordination, independent QA/QC, and post-preliminary processing by the MCC. Example C represents a DFIRM conversion prepared by the MCC with no new flood data. Example D depicts a "traditional" study for a non-CTC community. The SC would complete H&H modeling and floodplain mapping, and the MCC would provide up-front research, ongoing coordination, independent QA/QC, DFIRM production, and post-preliminary processing. Example E represents a project completed primarily by another Federal agency, such as the ongoing Upper Mississippi River restudy by the U.S. Army Corps of Engineers. The MCC would provide up-front research, ongoing coordination, and post-preliminary processing. There would also be moderate involvement from the CTC, perhaps through sharing of base map data for production of the DFIRM.



**Figure 4. Flexibility of assigning responsibilities in modernizing map production process.**

After assigning the responsibilities to the available resources, Time and Cost estimates will be prepared and submitted to the regional study manager. The study manager will then determine if the total costs are within the target study budget established through the Mapping Needs Assessment and budget allocation processes. If they are, the resources will be issued task orders and notified to proceed. If not, an iterative process will be followed to modify the scope of the project or the estimates or reassign the work amongst the available resources until the budget falls within the target budget.

FEMA has recently initiated a scoping objective, and it is envisioned that the MICS software will support the scoping process. Version 2 of the software will allow the FEMA study manager to develop a tailored scope of work and issue task orders for each available resource.

### 2.4 Production

Upon issuance of the task orders to the mapping resources by the FEMA study manager, production will begin. Because of the up-front coordination, each entity will understand what the final product will be and how its piece fits into that. Unlike the present process, under which work is completed in series, the various entities involved in the mapping process will complete work concurrently. For example, the CTC and SC may be conducting H&H modeling and preparing updated floodplain mapping for different flooding sources in the community concurrently. At the same time, the MCC can be digitizing non-revised information, conducting contiguous study checks, and compiling the Flood Insurance Study (FIS) report.

Communication between FEMA, FEMA's contractors, and the community/State/regional agency partners through MICS, teleconferences, and/or interim meetings will be essential to ensure that schedules are met and technical aspects of the mapping projects are coordinated.

The MICS software will allow for efficient management through sharing of information on budgets, schedules, etc. The software will also automate such management functions as developing and submitting Special Problem Reports and invoicing.

Additionally, H&H modeling and floodplain mapping for flood data updates will be subject to interim independent QA/QC reviews. The schedule and responsibility for performing these reviews will be established during the scoping process by the FEMA study manager. For example, the FEMA study manager may require the SC's work to be independently reviewed by the MCC at completion of the following stages of processing:

- ✓ Hydrologic phase—hydrologic analysis or coastal input parameters.
- ✓ Hydraulics phase—hydraulic analysis and sample floodplain mapping.
- ✓ Mapping phase—completed floodplain mapping.

Additionally, the community and State and regional agencies will be given the opportunity to review the study results at the interim steps listed above.



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Another option available to FEMA study managers to provide the necessary independent QA/QC would be for a CTC to evaluate work completed by the CTC's subcontractor and certify compliance with applicable FEMA standards and criteria, or an SC could review CTC efforts.

Upon completion of the H&H modeling and floodplain mapping (if part of the project scope), the effective and revised floodplain information will be merged by the entity specified in the initial scope of work to prepare the final DFIRM. While the final DFIRM production is underway, the revised floodplain information will be provided to the community and the statutory 90-day appeal period will be initiated. Because of increased coordination with and involvement by the community, the number of appeals and protests to preliminary flood maps should decrease.

Upon completion of the DFIRM and resolution of any appeals or protests, the final DFIRM will be distributed by the Map Service Center (MSC) and through FEMA's Flood Hazard Mapping Web site.



### **3.0 Map Modernization Plan Objectives**

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Based on accomplishments to date and current priorities for implementing certain components of the map modernization plan, FEMA has updated the list of map modernization objectives that was identified in FY 1998. These updates are outlined below.

#### **3.1 Completed Map Modernization Objectives**

Items that are fully developed, ongoing components of the flood mapping program will no longer be considered as map modernization objectives.

- ✓ Flood Hazard Mapping Web Site Architecture (on line October 1998)
- ✓ FEMA Map Assistance Call Center (operational January 1999)
- ✓ Multi-Year Study Contracts (implemented at regional office discretion)
- ✓ Guidelines and Specifications for Flood Map Production Coordination Contractors (completed February 1999)
- ✓ Memorandum of Agreement with Department of Defense (signed November 1998)

#### **3.2 Ongoing Program Objectives**

These ongoing flood mapping program objectives are no longer considered as map modernization objectives but are continuing under normal operations of FEMA's flood mapping program.

- ✓ Existing Cooperative Initiatives
- ✓ Awarding of New Map Coordination Contracts
- ✓ MSC Contract
- ✓ 44 CFR 65.5 Regulatory Reform
- ✓ Erosion Study Research
- ✓ Community Rating System (CRS) Task Force
- ✓ Assessment of User Fees

### 3.3 Deferred Objectives

Due to resource limitations, these activities have been deferred as FY 1999 objectives.

- ✓ Revise *Guidelines and Specifications for Study Contractors* (FEMA 37)
- ✓ Unmapped Community Inventory
- ✓ V Zone Guidelines and Specifications
- ✓ Revising the “Appeals, Revisions, and Amendments to NFIP Maps: A Guide for Community Officials,” dated December 1993

### 3.4 New Objectives

These new objectives have been identified and initiated.

- ✓ Automated H&H Modeling
- ✓ Zone A Areas
- ✓ Scoping of Flood Insurance Studies

### 3.5 Active Map Modernization Objectives for FY 1999

With the changes identified above, there are now 23 active map modernization objectives for FY 1999. These objectives are grouped into the following three categories:

#### **Products and Standards Objectives:**

- ✓ New DFIRM Product
- ✓ Base Map Specifications
- ✓ Advanced Remote Sensing Technologies
- ✓ Automated H&H Modeling
- ✓ Zone A Areas
- ✓ Revised Guidelines for Determining Flood Hazards on Alluvial Fans
- ✓ NFIRA Coastal Erosion Studies

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- ✓ Development of Recommendations for Using Future Conditions Hydrology for the NFIP
- ✓ Riverine Erosion Hazard Area Feasibility Study

### **Process Objectives:**

- ✓ Mapping Needs Assessment
- ✓ Scoping of Flood Insurance Studies
- ✓ Optimized Study Process
- ✓ CTCs
- ✓ MICS
- ✓ LOMA 2000
- ✓ Improving the LOMR Process
- ✓ Post-Flood Hazard Verification

### **Other Program Improvement Objectives:**

- ✓ LOMA and LOMR-F Delegation
- ✓ Map Modernization Outreach
- ✓ Regulations and Laws
- ✓ National Geodetic Survey Partnership
- ✓ U.S. Fish and Wildlife Service Partnership to Improve Mapping of Coastal Barrier Resources System Areas
- ✓ Participation in the U.S. Geological Survey National Digital Orthophoto Partnership Program

The following section describes each of the active map modernization objectives, including accomplishments to date, action plans, and deliverables.



## 4.0 Progress on Objectives

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### 4.1 Products and Standards Objectives

#### 4.1.1 New Digital FIRM Product

##### **Summary of Objective**

The DFIRM product involves converting the existing inventory of manually produced Flood Insurance Rate Maps (FIRMs) to digital format. The new digital product will be able to address maintenance needs as well as restudy needs. The DFIRM product will be designed to allow for the creation of interactive, multi-hazard digital maps. Linkages will be built into a database to allow users options to access the engineering backup material used to develop the map (e.g., H&H models, flood profiles, floodway data table, Digital Elevation Models (DEMs), and structure-specific data, such as digital elevation certificates and digital photographs of bridges and culverts).

##### **Accomplishments to Date**

The new DFIRM product work group was split into eight smaller subgroups that are focused on specific portions of the overall product. Additionally, the DFIRM work group met with representatives of the HAZUS team to identify areas of commonality. HAZUS is a loss estimation tool developed by FEMA initially for earthquake hazard loss estimation. A flood module is currently being developed. The activities of the eight subgroups are as follows:

- ✓ The DFIRM graphic specifications subgroup was formed to develop the graphic specifications for the new DFIRM product, including colors, patterns, lineweights, text fonts, etc. The first 14 prototypes were distributed to TMAC members and other select reviewers for a Phase 1 review on April 30, 1999. Copies of the prototypes were also displayed at the 1999 Association of State Floodplain Managers (ASFPM) and National Flood conferences. Review comments were solicited on one-color vs. multi-color printing and graphic presentation. The Phase 1 review comments were incorporated, as well as several recommended changes to the current FIRM border. Eleven Phase 2 prototypes were distributed for comment on August 18, 1999. Review comments are due September 17, 1999.
- ✓ The DFIRM database design subgroup was formed to develop the database architecture for the items that will be attached to the map graphics. This includes the structure for linking features to each other and to all the underlying engineering and back-up data. The first draft database design was distributed for review on July 16, 1999, and posted on FEMA's Web site on July 28, 1999. Review comments were received on August 30, 1999. Several prototype communities are under consideration for the next phase of database testing.

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- ✓ The use policy subgroup was formed to develop a recommended use policy that will help clarify issues for users as they migrate from a paper to a digital environment. A draft use policy is being reviewed by FEMA before its release to outside reviewers.
- ✓ The distribution subgroup was formed to address how the digital product(s) will be distributed. A draft distribution plan is being developed by this group.
- ✓ The metadata specifications subgroup will finalize the new DFIRM product metadata specifications once the database design is complete. The draft DFIRM database contains many items that will be used in the creation of metadata.
- ✓ The implementation plan subgroup will not be activated until the product design is complete. It is also dependent on funding levels. This group will need to coordinate its efforts with other related Mitigation activities and other Federal agencies.
- ✓ The user application needs subgroup will convene once the first database prototypes have been developed. A wide user base is expected to contribute ideas to this subgroup.
- ✓ The cost quantification subgroup will not be activated until the product design is complete.

### **Action Plan**

- ✓ Complete graphic specifications by October 29, 1999.
- ✓ Post database prototypes and second draft database design on FEMA's Web site by December 15, 1999.
- ✓ Complete DFIRM database specifications by April 1, 2000.

### **Deliverables**

- ✓ DFIRM Product Specifications.
- ✓ Guidelines for Use of Digital Products.
- ✓ Prototype Products.



### **4.1.2 Base Map Specifications**

#### **Summary of Objective**

Base maps cover the entire geographical area of a community and include roads, railroads, streams, and other physical features, as well as corporate limits and section lines. These map features are employed by map users to locate properties and structures relative to floodplains. The accuracy of base maps used in the production of FIRMs is important to the overall precision of FIRMs; therefore, updated minimum standards for base maps will be established for use in the development of FIRMs.

To be able to expend its limited dollars on flood studies, FEMA wants to rely on ongoing efforts of others for the development of base maps. The U.S. Geological Survey (USGS) has a National Digital Orthophoto Partnership program that involves partnering between Federal, State, and local governmental agencies for the production of Digital Orthophoto Quads (DOQs). The purpose of the Base Map Objective is: (1) To establish base map standards for State- or community-supplied mapping that would be acceptable for displaying the flood hazard; and (2) In the absence of State- or community-supplied mapping, to establish, if available, the USGS supplied DOQ as the default base map.

#### **Accomplishments to Date**

- ✓ Base map options have been established and prioritized. Community data that meet the minimum requirements will be the first choice. DOQs will be the default base map.
- ✓ A series of meetings have been held with the USGS to discuss partnering options for the acquisition of DOQs to support FEMA's DFIRM mapping needs. These meetings will continue.
- ✓ The base map specifications were finalized and distributed to the FEMA Regional Mitigation Divisions and the Technical Mapping Advisory Council on May 26, 1999.

#### **Action Plan**

- ✓ Establish a new map modernization objective titled "Base Map Strategy." This would include developing a strategy for obtaining base maps for implementation in FY 2000 and preparing FY 2000 DOQ Production Request Packages for submission to the National Digital Orthophoto Partnership Review Committee.

### **4.1.3 Advanced Remote Sensing Technologies**

#### **Summary of Objective**

This objective assesses LIDAR, IFSAR, and LIDAR/IFSAR fusion for use in gathering topographic and base map information for FISs. This objective also includes, as

appropriate, development of guidelines and specifications for these technologies in FEMA 37, *Guidelines and Specifications for Study Contractors*. As part of the implementation process of these technologies a training program will be developed and presented to FEMA staff and other organizations as required.

### **Accomplishments to Date**

#### LIDAR:

- ✓ Developed guidelines and specifications; received comments from Federal and State government, academia, and industry experts; received appropriate approvals; and published on FEMA Web site. (These are the first such guidelines and specifications in the United States.)
- ✓ Confirmed validity of published guidelines and specifications and developed additional guideline and specification items while reviewing the performance of four LIDAR vendors at the Lakewood, California, test site.
- ✓ Presented training on and critique of LIDAR performance at conferences and briefings, including conferences of the American Society for Photogrammetry and Remote Sensing, ASFPM, and the FEMA Regional Engineers (REs).
- ✓ Contracted with the Louisiana Oil Spill Coordinator's Office to prepare topographic maps from LIDAR-derived digital elevation models for approximately one quarter of the State using the published LIDAR guidelines and specifications.

#### IFSAR and LIDAR/IFSAR Fusion:

- ✓ Contracted with the Jet Propulsion Lab through the Army Topographic Engineering Center to evaluate performance and develop guidelines and specifications for use in FISs.
- ✓ Flew mission over the Red River of the North basin in North Dakota to collect data and evaluate the performance of both IFSAR and LIDAR/IFSAR fusion.

### **Action Plan**

#### LIDAR:

- ✓ Update guidelines and specifications to include items developed from vendor performance at the Lakewood, California, test site and review comments received at FEMA Web site.
- ✓ Develop costing guidelines for FEMA staff.
- ✓ Present briefings and training as required.

#### IFSAR and LIDAR/IFSAR Fusion:

- ✓ Continue to evaluate Red River of the North mission data.

- ✓ Develop and publish guidelines and specifications for FEMA 37, *Guidelines and Specifications for Study Contractors*, using mission data and draft of guidelines and specifications.
- ✓ Develop costing guidelines for FEMA staff.
- ✓ Present training and briefings for FEMA staff on an as-needed basis.

### **Deliverables**

- ✓ Enhanced LIDAR guidelines and specifications.
- ✓ New IFSAR guidelines and specifications.
- ✓ New LIDAR/IFSAR Fusion guidelines and specifications.

### **4.1.4 Automated Hydrologic and Hydraulic Modeling**

#### **Summary of Objective**

This objective is to assess the available technologies to automate the different aspects of floodplain analysis, including hydrology, hydraulics, and mapping. The available technologies are tools that work within a Geographic Information System (GIS) using software applications and database structures to perform any or all of the steps in floodplain analysis.

#### **Accomplishments to Date**

- ✓ Initiated work group in May 1999.
- ✓ Held several work group meetings.
- ✓ Developed a detailed list of well-known automation tools.
- ✓ Discussed issues, including whether the “tools” are computer models and, therefore, subject to strict model regulations; developed procedural memo to clarify these issues.
- ✓ Held preliminary discussions on development of Internet-based educational package.

#### **Action Plan**

- ✓ Continue to work on researching and documenting the available tools and their capabilities.
- ✓ Develop draft and final reports summarizing the findings.

- ✓ Develop Internet-based tutorial program to explain common techniques for automated H&H modeling and mapping.

### **Deliverables**

- ✓ Final Report: The report will include an assessment of the available technologies that are being used for automated hydrology, hydraulics, and mapping, as well as detailed explanation of each of the tools, including the capabilities, availability, GIS platform, limitations, and other information. FEMA REs, CTCs, communities, or SCs that are interested in automating all or part of the floodplain analysis process can use the report.
- ✓ Automated H&H Tutorial Program: The tutorial program is Internet-based and can be used by engineers to learn the detailed steps to automated H&H modeling. It will focus on the data requirements and the detailed steps to follow to perform automated H&H modeling tasks. It will use widely accepted and commonly used automation tools to perform the tasks to make the tutorial program useful to a wide audience.

### **4.1.5 Zone A Areas**

#### **Summary of Objective**

It is estimated that approximately 50 to 70 percent of Special Flood Hazard Areas on FEMA flood maps have the approximate Zone A designation. Zone A areas create unique problems for communities and private landowners because of the lack of detailed information. As FEMA implements its modernization plan to upgrade its flood map inventory, Zone A areas will be addressed as part of the upgrade. This newly initiated objective will develop guidance, tools, and processes to ensure, as the inventory is upgraded, that:

- Zone A areas are converted to detailed studies where the level of existing and/or proposed development warrants doing so;
- Zone A areas are more accurately delineated where detailed studies are not warranted; and
- Erroneous Zone A areas are removed.

#### **Accomplishments to Date**

- ✓ Developed a work plan.

#### **Action Plan**

- ✓ Develop guidance for evaluating Zone A areas at the scoping phase of flood studies, including determining appropriate levels of analysis.

- ✓ Develop recommendations and related guidance documents for improving Zone A processing.
- ✓ Assess automation technologies and analysis methodologies for revising/re-delineating Zone A areas.

### **Deliverables**

- ✓ Recommendation report addressing items listed under Action Plan, due on October 31, 1999.

### **4.1.6 Revised Guidelines for Determining Flood Hazards on Alluvial Fans**

#### **Summary of Objective**

Multiple variables can affect alluvial fans and flooding on alluvial fans, such as climate, fan history, vegetation, and land use. FEMA has developed an approach to identify and map flood hazards on alluvial fans that accounts for site-specific conditions.

The approach, detailed in the *Guidelines for Determining Flood Hazards on Alluvial Fans*, addresses recommendations in a 1996 report by the National Research Council's (NRC's) Committee on Alluvial Fan Flooding. The committee was created by the NRC, upon FEMA's request for assistance in dealing with alluvial fan flooding issues, to study how to improve the way FEMA addresses alluvial fan flood hazards in the context of the NFIP. The Guidelines provide guidance for the identification and mapping of flood hazards occurring on alluvial fans, including active and inactive alluvial fan flooding. The guidelines detail a three-stage approach for alluvial fan flooding identification and mapping.

#### **Accomplishments to Date**

- ✓ The revised *Guidelines for Determining Flood Hazards on Alluvial Fans* has been completed and posted on FEMA's Technical Services Division Web page for implementation.
- ✓ In addition to holding meetings with the work group and various constituencies over the last 2 years, FEMA widely distributed draft version(s) of the revised Guidelines for peer review. This peer review included people from academia, Federal, State, regional, and local governments, and the private sector. The draft was distributed to staff of FEMA Headquarters (HQ) and Regional Offices (ROs), members of the Technical Mapping Advisory Council, members of the NRC Committee on Alluvial Fan Flooding, ASFPM representatives, various local communities, regional flood control districts, State agencies in the western United States that have experience mapping alluvial flood hazards and regulating land use on the fans, and private consultants experienced with evaluating fan hazards. The wealth of knowledge provided through comments in the peer review included those with experience in hydrologic and hydraulic engineering, geomorphology,

soil science, and floodplain management. Over the last 2+ years, the proposed approach, as well as the Guidelines, have been presented at a number of conferences in the western United States, including conferences in California, Nevada, Arizona, and Oregon.

### **Action Plan**

- ✓ Immediate implementation of Revised Guidelines for MCCs, SCs, and map revision requesters.

### **Deliverables**

- ✓ Revised *Guidelines for Determining Flood Hazards on Alluvial Fans* (FEMA 1999).
- ✓ Web page with Guidelines available, as well as related information on alluvial fan flood hazards at [http://www.fema.gov/mit/tsd/ft\\_alfan.htm](http://www.fema.gov/mit/tsd/ft_alfan.htm).

### **4.1.7 NFIRA Coastal Erosion Studies**

#### **Summary of Objective**

This objective provides for the completion of the evaluation of erosion hazards mandated by section 577 of the National Flood Insurance Reform Act of 1994 (NFIRA). The study evaluates the economic impact of erosion and erosion mapping on communities and on the NFIP. More specifically, the purpose of the study is to determine whether erosion hazard areas should be mapped for risk delineation, floodplain management, and the establishment of flood insurance risk classifications that more directly reflect the effects on the NFIP premium rates of long-term erosion.

#### **Accomplishments to Date**

FEMA is conducting the study in two phases.

- ✓ In the first phase, erosion hazard areas were mapped for 27 coastal counties in 18 States. This portion of the study was conducted by State Coastal Zone Management organizations, or their designees, and was completed in December 1997.
- ✓ The second phase required three principal tasks, all conducted by the H. John Heinz Center. The first task is completed; the second and third tasks are ongoing. The first task was an inventory of structures located within the mapped erosion hazard areas. This task was completed May 1999. The second task is the economic impact analysis of erosion on coastal communities and on the NFIP. This task should be completed January 31, 2000. The third task is to conduct an analysis to determine whether it is cost-beneficial to map erosion hazard areas through the NFIP. This task should be completed January 31, 2000.

### **Action Plan**

- ✓ Receive delivery of Heinz Center Report by January 31, 2000.
- ✓ Provide Heinz Center Report to OMB for review and comment.
- ✓ Prepare a formal presentation of the study findings to Congress.

### **Deliverables**

- ✓ Report prepared for FEMA by the H. John Heinz Center, due January 31, 2000.

### **4.1.8 Recommendations for Using Future Conditions Hydrology for the NFIP**

#### **Summary of Objective**

Flood risk information presented on the flood maps is based on the existing conditions of the floodplain and watershed. After publication of the maps, however, flood hazards may change significantly in areas experiencing urban growth or changes in physical conditions caused by such geologic processes as subsidence and erosion. When the mapping of flood hazards was initiated under the NFIP, the intent was to reassess each community's flood hazards periodically and, if needed, revise the maps. However, budgetary constraints prevent initiating actions to update flood maps with sufficient frequency to reflect the changing flood hazards brought about by natural and man-made changes. Although the existing conditions floodplain will continue to be mapped for flood insurance purposes, future conditions hydrology could also be mapped so that communities could use this information for floodplain management.

#### **Accomplishments to Date**

- ✓ Held a series of meetings over the last 12-18 months.
- ✓ Completed draft reports, including a sample FIS report and FIRM that included future hydrology considerations.
- ✓ Distributed draft reports for review and comment to FEMA HQ and Regional Mitigation staff, the Federal Insurance Administration, the Office of General Counsel, the Technical Mapping Advisory Council, and other interested constituencies such as local communities that currently utilize future conditions.
- ✓ Presented the proposed approach, as well as the preliminary recommendations of the report, at a number of conferences in the United States.
- ✓ Currently constructing a Technical Services Division Web page for the future conditions report; expected to be posted by September 1999.

### Action Plan

- ✓ Receive final comments and/or concurrence on final draft report by September 1999.
- ✓ Implement prototype in FY 2000.

### Deliverables

- ✓ Final report *Recommendations for Using Future Conditions Hydrology for the NFIP*.
- ✓ Technical Services Division Web page.

### 4.1.9 Riverine Erosion Hazard Area Feasibility Study

#### Summary of Objective

This objective is to conduct the Riverine Erosion Hazard Area (REHA) Mapping Feasibility Study in response to Congress enacting NFIRA into law on September 23, 1994. Section 577 of NFIRA requires that FEMA submit a report to Congress that evaluates the economic impact of erosion and erosion mapping on the NFIP (for coastal and Great Lakes) and determine if it is technologically feasible to map REHAs. Technological feasibility is defined as the existence of methodologies that are scientifically sound and implementable under the NFIP. Scientifically sound means that the methodologies are based on physical or statistical principles and are supported by the scientific community. Implementable means that the approaches can be applied by FEMA as part of a nationwide program under the NFIP and for an acceptable cost.

The objectives of the study are to:

- ✓ Define riverine erosion processes;
- ✓ Discuss geomorphic and engineering methods that can be used to map REHAs;
- ✓ Evaluate the methods of predicting and modeling REHAs that have been applied in selected case studies within the United States;
- ✓ Evaluate the approximate costs to study and map REHAs;
- ✓ Discuss programmatic elements associated with mapping and regulating REHAs; and
- ✓ Determine the technological feasibility of mapping REHAs.



### **Accomplishments to Date**

- ✓ Completed an in-depth search and technical evaluation of existing methodologies used to predict and map REHAs.
- ✓ Prepared a final draft report.
- ✓ Over the last 12+ months, developed and distributed draft reports to the Technical Mapping Advisory Council, FEMA staff, and the Project Working Group for review and comment. The Project Work Group is an external group of technical advisers with expertise in assessing and managing riverine erosion hazards and consists of individuals from throughout the United States representing Federal, State, regional, and local government; academia; and the private sector.
- ✓ Over the last 2+ years, presented the proposed approach, as well as the preliminary results of the study, at a number of conferences in the United States.

### **Action Plan**

- ✓ Following internal FEMA reviews, submit final report to Congress in January 2000.

### **Deliverables**

- ✓ Final report to Congress.
- ✓ FEMA Technical Services Division Web site.

## **4.2 Process Objectives**

### **4.2.1 Mapping Needs Assessment**

#### **Summary of Objective**

To develop map update priorities and expend the flood mapping budget in the most cost-beneficial manner, a complete, accurate assessment of flood mapping needs is essential. The Mapping Needs Assessment Process and MNUSS hold the most promise to serve as the primary tools used by FEMA to document all map update needs nationally and develop cost estimates, which will include engineering, mapping, production, printing, and distribution costs. The Mapping Needs Assessment Process primarily relies on contacting all mapped communities participating in the NFIP and documenting the identified needs in MNUSS. MNUSS will be used to rank and prioritize map update needs. This ranking and prioritization list will then be used in conjunction with the fiscal year budget to determine which map updates to initiate in that fiscal year.

### **Accomplishments to Date**

- ✓ Completed the first 5-Year cycle by contacting approximately 17,500 communities participating in the NFIP (approximately 34% responded).
- ✓ Identified approximately 8,000 individual flood data update and map maintenance needs for community ranking purposes.
- ✓ Developed an approach to consolidate and prioritize communities based on identified mapping needs in MNUSS.

### **Action Plan**

- ✓ Complete the programming and testing of the enhanced version of MNUSS to capture additional data fields and to add the capability to consolidate and rank all mapping needs (flood data update, map maintenance, and/or digital conversion) for a community.
- ✓ Community surveys will continue to be an integral component of the assessment of flood mapping needs. An improved questionnaire is under development for use during the second cycle. Additionally, more efficient methods for communities to provide data, such as through the Internet, are being considered.
- ✓ Integrate the mapping needs collection process with the Biennial Report Survey.
- ✓ Complete detailed, objective assessments of community mapping needs so MNUSS can be implemented as a decision-making tool.
- ✓ As part of the CTC initiative, FEMA will be pursuing assessments of community mapping needs as a partnership activity with State and regional agencies; the resultant data will be used to populate the enhanced MNUSS. To assist FEMA's partners in completing such assessments, FEMA has completed guidance on conducting objective assessments of community flood mapping needs.

### **4.2.2 Scoping of Flood Insurance Studies**

#### **Summary of Objective**

The purpose of this objective is to develop guidance and identify tools to be used by FEMA's study managers during the scoping phase of the flood map development and production process. This phase involves identifying the community's mapping needs (restudy and map maintenance), determining study methodologies, identifying the available data and their source and format, determining which optional data layers will be included in the DFIRM product, and collecting the necessary data. It also includes assigning tasks to the various entities involved in the flood map development/production process (SCs, MCCs, CTCs, and Federal, state, and other agencies), establishing schedules for reviews and deliverables, assigning budgets, and

identifying deliverable requirements and information management and reporting needs.

### **Accomplishments to Date**

- ✓ Initiated work group in September 1999.
- ✓ Developed list of key issues to be addressed.

### **Action Plan**

- ✓ Develop general guidance, listing of available FEMA and contractor resources, and management tools to prepare for and conduct community-contractor coordination meetings.
- ✓ Develop a process for selecting DFIRM options during the scoping phase.
- ✓ Develop specifications for the standard deliverables that typically are identified in the scoping process and production process.
- ✓ Develop guidance from the Mapping Needs Assessment process for preparing pre-Time-and-Cost scoping packages and other products needed.
- ✓ Develop guidance for conducting community-contractor coordination meetings under the new optimized study process.
- ✓ Recommend enhancements to information management tools, such as MNUSS, MICS, and the Community Information System (CIS), as needed. Develop other supplementary scoping and scheduling tools.

### **Deliverables**

- ✓ Report with recommendations for implementing a comprehensive scoping process.

### **4.2.3 Optimized Study Process**

#### **Summary of Objective**

The purpose of this objective is to optimize the FIS process so that each community's FIRM can be created, revised, distributed, and stored more efficiently and effectively. To accomplish this objective, each task from FIS initiation to FIS publication to FIS storage was described. Options for the accomplishment of each task were identified, and recommendations were provided. The specialized skills and abilities from both the public and private sectors that are necessary to accomplish each FIS task can be utilized, resulting in the highest-quality FIS and FIRM possible.

### Accomplishments to Date

A report has been delivered with the following recommendations:

- ✓ The work group recommends that the responsibilities of the SC, MCC, ROs, FEMA HQ, State, and communities (including CTCs) be flexible to maximize the particular expertise and capability of each team member. The responsibilities of each should be detailed in the Task Order Statement of Work (SOW) and CTC agreement (as applicable). The MICS database will be enhanced to assist the RO in producing the SOWs and community agreements for each FIS.
- ✓ In addition, the work group recommends that an assigned FEMA RE, assisted by an FIS management team, manage all studies throughout their life cycle. A HQ management work group will need to be created to address staffing and resources for management oversight and reporting of studies for the entire national flood mapping program.
- ✓ The work group recommends implementing the optimized study process, which will reduce the average FIS processing time by 60%. This projected time reduction was realized through parallel tasking of restudy assignments, early and more appropriately timed QA/QC reviews, and increased coordination between the ROs, HQ, the SCs, the MCCs, communities, and States. The processing time could be reduced by initiating the 90-day Appeal Period with the draft FIS submission and by making the 6-month Compliance Period independent of the FIRM effective date.
- ✓ To streamline the SC contracting phase of the FIS process, the work group recommends multi-year Indefinite Delivery-Indefinite Quantity (IDIQ) Task Order Contracts for SCs. HQ should award the contracts, and the ROs should write the Task Orders. The ROs will also write the SOWs and continue to monitor and administer the SC work. With other phases of administration, the ROs may be assisted by members of the FIS management team, as needed. The work group also recommends, where cost effective, that separate aerial mapping contracts be available to each RO.

### Action Plan

A suggested implementation plan and schedule for each recommendation has been included in the final report. The following recommendations from the final report are being pursued in FY 2000:

- ✓ Implement parallel study process, wherein the various entities involved in the mapping process complete work concurrently.
- ✓ Implement 5-Year IDIQ contracts for SCs beginning in FY 2000 for the FIS acquisition process (ongoing).

- ✓ Combine FIS, MCC, and SC Guidelines and Specifications into one document that can be readily amended, as necessary (deferred until more progress is made in this objective).
- ✓ Scoping of FISs has been established as a new map modernization objective.

### **Deliverables**

- ✓ Final report was completed on May 21, 1999.

### **4.2.4 Cooperating Technical Communities**

#### **Summary of Objective**

This objective is to develop and implement the CTC initiative whereby partnerships are formed with communities, States, and/or regional agencies to fully integrate them into FEMA's flood hazard mapping process. FEMA will maintain its national standards for NFIP mapping while building on local, State, and regional mapping knowledge and capabilities. This collaboration will make more resources available for flood hazard data collection and mapping efforts nationwide.

#### **Accomplishments to Date**

FY 1999 was a pilot year for this initiative. The following activities have been accomplished:

- ✓ Completed the conceptual design of the initiative and developed detailed guidance.
- ✓ Developed a *Federal Register* notice regarding the CTC initiative. Publication anticipated in September 1999.
- ✓ Designated pilot CTC partners for FY 1999. A total of 30 CTC agreements nationwide are anticipated to be in place by September 30, 1999.
- ✓ Completed the CTC Memorandum of Agreement template.
- ✓ Developed template agreements for nine specific types of mapping activities.
- ✓ Developed the CTC component of the FEMA Flood Hazard Mapping Web site.
- ✓ Conducted outreach activities on the CTC initiative.

#### **Action Plan**

FY 2000 will also be considered a pilot year, as improvements to this initiative are made based on lessons learned from 1999 efforts. The following activities are planned:

- ✓ Develop a public relations package for the CTC initiative.

- ✓ Pursue enhancements to the MICS software to track information on the CTC initiative.
- ✓ Develop eligibility criteria for CTC mapping activities.
- ✓ Establish incentives for CTC participation through the NFIP's Community Rating System (CRS).
- ✓ Develop additional and improve existing mapping activity templates, as required.
- ✓ Enhance Web site information on CTCs.
- ✓ Enter into additional CTC agreements.

### **4.2.5 Monitoring Information on Contracted Studies**

#### **Summary of Objective**

As the REs' workload continues to increase, automating portions of the SC monitoring process is necessary to maintain the quality of the work. Although the CIS provides part of the required information, this system is community-based and does not contain the project management or accounting tools to effectively automate the contracted study process.

The MICS system is designed to complement the CIS by tracking contracted studies from initiation to completion. The system is a study-based system designed for use by REs and SCs. Specifically, MICS is designed to 1) include information on SC selection and contract awards, 2) track budgets in both hourly and dollar amounts, 3) record details of monthly SC contacts and regulatory visits, 4) include Special Problem Reports, and 5) provide SC-specific information.

#### **Accomplishments to Date**

- ✓ Completed a Beta-version of the MICS system. The system has been installed at FEMA HQ, and internal testing of the software has been nearly completed. The system will be ready for external testing by REs and SCs shortly.
- ✓ Currently revising the User's Manual.

#### **Action Plan**

Future activities will focus on completing the Beta-testing of the MICS system and getting a final version on-line. Specific tasks to be conducted in the future will include the following:

- ✓ Complete internal and external Beta-testing and incorporate comments.
- ✓ Complete the revisions to the User's Manual.

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- ✓ Enhance the MICS system with additional features, such as additional alert screens, advanced invoicing and accounting functions, e-mail functions, and a CIS interface.
- ✓ Develop a long-term maintenance plan.

### **Deliverables**

- ✓ A complete, fully functional MICS system will be brought on-line.
- ✓ A revised User's Manual will be prepared and distributed with the release of the system.

### **4.2.6 LOMA 2000**

#### **Summary of Objective**

LOMA 2000 is the name given to a new software package that is currently being developed that will automate Letter of Map Change production. This software will generate and track Letters of Map Amendment (LOMAs) and Letters of Map Revision - based on Fill (LOMR-Fs). This software will increase processing efficiencies as well as generate a product that will be available over the Internet.

#### **Accomplishments to Date**

- ✓ Manual version of LOMA 2000 documents completed and operational March 1999.
- ✓ Programming of automated version of LOMA 2000 (Version 1.0) completed, and the first automated LOMA issued August 1999. Version 1.0 will generate 70% of the total FEMA production of LOMAs and LOMR-Fs.

#### **Action Plan**

- ✓ Version 1.1 of LOMA 2000 scheduled for completion in October 1999. This version will generate about 95% of the total FEMA production of LOMAs and LOMR-Fs.
- ✓ Version 2.0 will be linked to the MCC STATUS (community information database) and will be accessible via the FEMA intranet. This version will be ready in approximately 6 to 8 months.
- ✓ Version 3.0 will be accessible via the Internet and will be in operation in the year 2000.

### **4.2.7 Improved LOMR Process**

#### **Summary of Objective**

To address this map modernization objective, the work group is developing a new Letter of Map Revision (LOMR) product. The objective is to improve the LOMR process by developing technical and administrative enclosures that succinctly describe map changes and community responsibilities as a result of LOMRs. Presently, the LOMR is a lengthy, complex letter involving technical, regulatory, and general information. Because of the length and format of the letter, recipients often must search for the information most important to them, which is, most typically, how the LOMR revises the map. In addition, preparation of the letter is inefficient in that standard information must be prepared and reviewed for each letter.

#### **Accomplishments to Date**

- ✓ The work group has prepared a draft product that consists of a cover letter and several enclosures. The cover letter describes the basis of the request and states the impact of the LOMR. Placing this information in a separate cover letter will make it immediately accessible. In addition to providing easy access to specific information, the new LOMR format should decrease processing time by streamlining the letter-preparation process. The following enclosures are included, as applicable:
  - Annotated portions of the FIS, such as Floodway Data Tables, profiles, Summary of Discharge Tables, etc.
  - Annotated portions of the FIRM, Flood Boundary and Floodway Map, or Flood Hazard Boundary Map.
  - Summary of *Federal Register* and newspaper notices publicizing the flood hazard changes.
  - Comparison of the flood hazards as determined by the modeling used for the effective map, the modeling of the conditions existing before the project, and the modeling of conditions after construction of the project.
  - List of data submitted.
  - Regulatory authority for making the map revision.
  - Additional information and reminders.
- ✓ The work group is also considering ways to exploit computer technology to improve the engineering review and letter-preparation processes. For instance, database tables could be used throughout the LOMR process to provide an up-to-date "case history." Through the database, engineers would have immediate access to the pertinent information about the case. The database could be accessed by personnel staffing FEMA's Map Assistance Center to field questions regarding the status of requests, and aspects of the database could be linked to



FEMA's Web site. Ultimately, the LOMR writing itself could be automated: the information in the database could be accessed to automatically fill in the information required for the letter and enclosures.

Automation of the LOMR process will allow the engineer to concentrate more fully on reviewing the technical aspects of the revision. It will also allow easy data archival and retrieval for responding to future queries. By simplifying the LOMR format and automating aspects of the review process, FEMA will enhance customer service and satisfaction.

### **Action Plan**

- ✓ Revise the cover letter and the attachments to incorporate the comments received from the work group members.
- ✓ Investigate the feasibility of automating the process up front, as well as including conditional LOMRs in the objective.
- ✓ Test and review sample letters using the new product.

### **Deliverables**

- ✓ A form-driven document that will be aimed at simplifying and enhancing the current LOMR and conditional LOMR and that will mirror the efforts and appearance of the LOMA 2000 effort.

## **4.2.8 Post-Flood Hazard Verification**

### **Summary of Objective**

Flooding events provide a valuable opportunity to evaluate the mapped flood hazards. This objective is to develop a standard procedure for verifying the accuracy of the FIS and FIRM for a flooded community declared a disaster area by the President and, if necessary, revising the FIS and FIRM. Providing such up-to-date flood hazard information will be vital to a community's reconstruction efforts after an event.

### **Accomplishments to Date**

- ✓ Establishment of draft work plan.
- ✓ Presentation on objective at the Engineers Conference in October 1998.
- ✓ Initial meeting of work group members on November 30, 1998.
- ✓ Initial subgroup meetings held and completion of subgroup outlines in February 1999.
- ✓ Objective placed on hold to allocate resources to other map modernization objectives in March 1999.

### Action Plan

- ✓ Draft post-flood hazard verification document and route to group members by February 2000.
- ✓ Hold second work group meeting in March 2000.
- ✓ Distribute second draft of post-flood hazard verification document in April 2000.
- ✓ "Test Drive" document in a real disaster (beginning of hurricane season in June 2000).

### Deliverables

- ✓ A stand-alone procedure (most likely as an insert to the Emergency Support Team manual) that can be applied nationally to a Presidentially declared disaster. It will provide guidance to all parties involved on how and what data should be collected in a post-disaster environment to facilitate response and recovery and mitigation efforts.

## 4.3 Other Program Improvement Objectives

### 4.3.1 LOMA and LOMR-F Delegation

#### Summary of Objective

This objective has been created to investigate and address the issues and concerns regarding the delegation of the LOMA and LOMR-F authority to the community and private sector, particularly licensed surveyors and professional engineers.

#### Accomplishments to Date

- ✓ A meeting was held December 9, 1998, between FEMA and certain LOMA and LOMR-F user constituents from the States and professional organizations.
- ✓ A summary report was prepared and distributed on August 17, 1999, with a copy of the meeting minutes, to the FEMA Regional Mitigation Divisions, the December 9<sup>th</sup> meeting participants, the ASFPM Mapping Committee, and the Technical Mapping Advisory Council.

### Action Plan

- ✓ In FY 2000, the Technical Services Division will continue to examine all aspects of the current LOMA and LOMR-F process to determine what can be modified to simplify the process. Both the public and private sector will be involved in that process.

### **4.3.2 Map Modernization Outreach**

#### **Summary of Objective**

This objective is to develop and implement a marketing plan for map modernization. It seeks to publicize the map modernization plan to facilitate progress on all the other objectives of the plan. Providing information about the plan will allow many disparate parties to work together to further the goals of map modernization.

#### **Accomplishments to Date**

- ✓ FEMA created two publications in May 1998 that explain the plan and how it complements Project Impact: *Modernizing the Flood Hazard Mapping Program* and *Modernizing the Flood Hazard Mapping Program: Community Involvement and Ownership*. FEMA has distributed these publications at numerous conferences and meetings and in response to inquiries about the map modernization plan.
- ✓ FEMA has published a bimonthly bulletin tracking the progress on map modernization, *Work in Progress*. Each issue highlights several of the objectives and discusses the progress to date. *Work In Progress* has evolved to be an exclusively Web-based publication.
- ✓ FEMA has provided information about mapping modernization at many conferences and other meetings.
- ✓ FEMA has written numerous articles about the map modernization plan for publication in trade magazines and newsletters.

#### **Action Plan**

- ✓ At upcoming conferences and meetings with stakeholders, FEMA will present information on the progress of individual objectives of map modernization as well as progress on the plan as a whole. Map modernization is also featured on FEMA's Web site ([www.fema.gov/mit/tsd](http://www.fema.gov/mit/tsd)).
- ✓ In FY 2000, the Map Modernization portion of FEMA's Web site will be overhauled to improve its usability.

### **4.3.3 Regulations and Laws**

#### **Summary of Objective**

As plans and specifications are finalized for the other objectives, this work group will evaluate the regulatory impacts of the map modernization plan. The work group, which uses a more holistic approach than the work group for the regulatory reform for 44 CFR 65.5, will review regulatory impacts of the overall map modernization effort as well as specific objectives. The work group will present its findings to FEMA and Congressional representatives.

### **Accomplishments to Date**

Due to the dynamic nature of the scope of the map modernization plan and because plans and specifications are still being finalized for other objectives, the work on this objective is in its early stages.

#### **4.3.4 National Geodetic Survey Partnership**

##### **Summary of Objective**

Develop a formal partnership between FEMA and the National Geodetic Survey (NGS) to improve coordination and cooperation. The NGS, a part of the National Oceanic and Atmospheric Administration, maintains a network of more than 750,000 precisely located monumented reference points in the United States. The NGS's accurate national reference network and Global Positioning System photogrammetry provide a universal set of coordinates across city, county, or State lines. FEMA requires such a foundation of accurate coordinates for its flood maps.

##### **Accomplishments to Date**

- ✓ Objective participants have agreed that a formal partnership between FEMA and NGS is in the best interests of both agencies. In addition, FEMA 37, *Guidelines and Specifications for Study Contractors*, is being revised to mandate the use of NGS high-accuracy benchmarks from the National Spatial Reference System in lieu of FEMA's traditional Elevation Reference Marks.

##### **Action Plan**

The NGS has submitted a draft Memorandum of Understanding (MOU) to FEMA for review. Following a review by FEMA, a meeting will be held between FEMA and NGS to finalize the MOU in October 1999.

#### **4.3.5 U.S. Fish and Wildlife Service Partnership to Improve Mapping of Coastal Barrier Resources System Areas**

##### **Summary of Objective**

This objective is to establish partnership with and provide technical assistance to the U.S. Fish and Wildlife Service to improve mapping of Coastal Barrier Resources System (CBRS) areas. Specifically, the objective is to encourage and assist the Service in producing digital, vector mapping suitable for direct incorporation as a thematic layer in DFIRMs and potential posting on the World Wide Web.

### Accomplishments to Date

- ✓ Several meetings have been held between the agencies to discuss ongoing initiatives and future opportunities that facilitate the partnership objectives.
- ✓ Completion of the Dare County, North Carolina, pilot CBRS mapping project whereby the existing CBRS maps in Dare County were superseded by larger scale, horizontally controlled, digitally produced maps. This marks the first digital 1"=1,000' scale maps produced for CBRS boundaries.
- ✓ The Dare County CBRS maps will soon be introduced into Congressional legislation. Although the use of the digital data may be limited, the effect of this may result in the first set of horizontally controlled (georeferenced) digitally produced CBRS source maps being formally adopted into public law by an act of Congress.
- ✓ Continued meetings with Congressional delegations to investigate potential funding of a digital CBRS pilot mapping project.
- ✓ Mapping all previously unmapped CBRS units using DOQs.
- ✓ Participation in a CBRS workshop at the National Flood Conference.
- ✓ Processing changes to CBRS boundaries through the LOMR process. This new procedure significantly reduces the processing time for showing modified CBRS boundaries on FIRMs.
- ✓ Posting of World Wide Web CBRS database and establishment of protocols for maintenance and update of these data.

### Action Plan

- ✓ Continue to hold meetings on an as-needed basis to address continuation of the objectives in this task.
- ✓ Continue to pursue further digital conversion of CBRS boundaries similar to the Dare County pilot project to eventually be adopted by Congress and ultimately to be used for floodplain management purposes.
- ✓ Assemble comprehensive library of all CBRS-related documents to assist and support both agencies in research and development initiatives.

**4.3.6 Participation in the U.S. Geological Survey National Digital Orthophoto Partnership Program**

**Summary of Objective**

This objective is to establish a partnership with USGS through the National Digital Orthophoto Partnership (NDOP) program. Through the NDOP Program, DOQs are produced for those communities where no community base map that meets the FEMA base map specifications exists.

**Accomplishments to Date**

- ✓ A series of meetings has been held in 1999 with the USGS to discuss partnering options for the acquisition of DOQs to support FEMA's DFIRM mapping needs. These meetings will continue.
- ✓ The draft MOU for FEMA participation in the USGS NDOP program was submitted to FEMA on August 20, 1999, for review. Comments are due from FEMA by October 1, 1999.

**Action Plan**

- ✓ FEMA must submit comments and a commitment to the USGS by October 1, 1999.
- ✓ By January 2000, FEMA must name representatives for the NDOP steering committee, project coordination subcommittee, and technical subcommittee.

**Deliverables**

- ✓ An MOU with the USGS. (If FEMA enters into a cost-share arrangement with the USGS for the production of the DOQs or other base map products, FEMA will have to execute an Interagency Agreement with the USGS.)
- ✓ Based on a reasonable production schedule identified through the Mapping Needs Assessment Process, the USGS would produce base mapping for new studies and revisions, where acceptable base map data do not exist.